

# UNITED STATES PATENT OFFICE.

CARL MARIA PIELSTICKER, OF LONDON, COUNTY OF MIDDLESEX, ENGLAND.

## PROCESS OF PURIFYING ALCOHOL.

SPECIFICATION forming part of Letters Patent No. 412,931, dated October 15, 1889.

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*To all whom it may concern:*

Be it known that I, CARL MARIA PIELSTICKER, a subject of the Queen of Great Britain, residing at London, in the county of Middlesex, England, have invented a certain new and useful Improvement in the Process of Purifying Alcohol, of which the following is a specification.

Among the means employed for the purification of alcohol from aldehyde, fusel-oil, and other accompanying higher alcohols, is the use of oxidizing agents. It has been found, however, that the aldehyde was hardly acted upon at all by them, and that the ethers formed from the oxidized fusel-oil being more volatile than the fusel-oil itself distilled off with the ethyl alcohol, and although of a less objectionable character than the fusel-oil, still they added an unpleasant smell and flavor to the alcohol. By agitating the impure alcohol with mineral hydrocarbons good results have been obtained; but while some of the alcohols readily part with their impurities to the hydrocarbon, yet with others it requires prolonged agitation of the impure alcohol with the hydrocarbon to free the former completely from its impurities. When, however, the impure alcohol is first treated with an oxidizing medium and then agitated with a hydrocarbon, by preference derived from the distillation of petroleum, or instead of hydrocarbon with a saponifiable oil, fat, or resin, the oxidized impurities combine much more readily with the hydrocarbon or saponifiable oil. The action is greatly accelerated and more complete if an electric current is passed through the alcohol at the same time. It is essential that the current should be created in the alcohol itself, by means of an alkaline solution acting on metal plates, by preference zinc and iron, forming a voltaic element, in consequence of which not only the fusel-oil, but also the aldehyde contained in the alcohol, is acted upon. I find that if a current is created by the action of an acid or acid salt on metals in the alcohol itself the acid attacks the ethyl alcohol also and converts a portion of it into ethers, and thus causes losses.

In carrying out my invention I proceed as follows: The impure alcohol is contained in a suitable tank, and is first diluted to about thirty per cent. To the diluted alcohol is

then added a saturated solution of from one-tenth to one and one-fourth per cent. of an oxidizing medium—as, for instance, permanganate or chlorate of potash, or of oxide of manganese or chloride of lime; also, an alkaline solution of a gravity of from 1.20 to 1.30, and in such quantity as, together with the oxidizing medium, will bring the alcohol down to twenty per cent., (more or less.) The mixture is then heated—as, for example, by a steam-coil contained within the tank—to about 50° centigrade. About five per cent. of hydrocarbon or oil is then added to the mixture, the whole being then suitably agitated, when the oxidized impurities will combine with the hydrocarbon. The mixture as a whole is then allowed to rest, when the purified alcohol will separate by gravity from the hydrocarbon and impurities, which will rise to the top, after which the purified alcohol is redistilled.

To accelerate the action of the oxidizing medium and make it more complete, I place in the tank containing the mixture a zinc and an iron plate and couple them together to form a voltaic element. The voltaic elements may be in position during the oxidizing treatment, or may be added next thereafter, and either before or after the addition of their excitant. A current is created by the addition of an alkaline solution of such gravity and to the same extent as previously mentioned, capable of producing an electric current between the zinc and the iron without exerting a decomposing action on the alcohol.

All the impurities contained in the alcohol combine in a few minutes with the hydrocarbon or oil, and after allowing the mixture to clear itself the purified alcohol is subjected to rectification and a perfectly neutral spirit obtained.

The oil treatment may be repeated, if desired.

Although I have described the oil treatment as taking place before rectification, yet the alcohol may be rectified after the oxidizing process is finished and the oil treatment follow after rectification, and any traces of oil adhering to the alcohol be removed by filtration.

Having fully described my invention, what I desire to claim and secure by Letters Patent is—

1. The herein-described process of purifying alcohol, which consists in diluting the same, then adding an oxidizing agent, then adding an alkaline solution, thereby setting  
5 up voltaic action between suitable voltaic elements immersed in the mixture, then adding a hydrocarbon, then heating the mixture and agitating the same, and then separating the pure alcohol by gravity.

10 2. The herein-described process of purifying alcohol, which consists in diluting the same, then adding an oxidizing agent, then

adding an alkaline solution in presence of voltaic elements immersed in the mixture, thereby setting up voltaic action between said 15 elements under the influence of the alkaline solution, and creating an electric current in the alcohol to be purified.

CARL MARIA PIELSTICKER.

Witnesses:

WALTER J. SKERTEN,

GEO. W. FRANKLIN,

*Both of 17 Gracechurch Street, London, E.C.*